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## OPAC 2.0: Towards the Next Generation of Online Library Catalogues

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### Abstract

*While the 4th Law of S.R. Ranganathan's Five Laws of Library Science (1931) says that: "Save the time of the reader", it is a big question to ask whether the current Library catalogues precisely do this for its library patrons. There is a common understanding that the evolution of OPAC should be in line with the evolution of technology and its services. They have to be designed in such a way that the users should be able to find what they are looking for in a timely manner only then they will be more satisfied, and more likely to feel like their needs have been met. While it is mandatory that the OPACs should not be a complex matrix for the users, it is important that it should encompass the current trends and features of advancements. There is no doubt that Librarians are the Architects to design best next generation OPACs by amalgamating Web 2.0 tools and the social networking aspects to the traditional catalogues which offer interacting options to the patrons. This paper looks at the current trend in formulating the next generation of Online Library catalogues with glimpses of isolated experiments and improvements in the library catalogues coupled with various open source software packages for OPAC 2.0 and the benefits to the users therewith.*

**Keywords:** Catalogue, Library 2.0, OPAC 2.0, Web 2.0, OPAC

### 1. Introduction

The basic purpose of a library catalogue is to provide a record of the library holdings so that the resources in the library can be better utilized. Libraries have been providing this service since time immemorial. The advent of microprocessors, especially in the fields of commerce and information science, saw the advent of First generation (1960s and 1970s) OPAC services which provided computerized access to catalogue records using the MARC bibliographic format. This was followed by the second generation (1980s) of OPACs which enhanced the search techniques by introducing keyword searching and Boolean operators to combine keyword search terms and have also gone through several cycles of change and transformation. Since then, many attempts are consistently made to enhance the search in OPACs; notable among them are partial-match techniques, correcting spelling errors, keyword suggestion "find similar", term weighting to name a few. The real transformation of OPAC started in the late '90's when OPACs embraced the internet technologies and the integrated

Library Systems started using the Internet as a main medium of access to the catalogue. The amalgamation of different utilities and features clearly suggest that “in fact the OPAC was probably the inspiration for many of the cutting edge services we find on the Internet today” (Fox 2007). The impending evolution of the OPAC is undoubtedly the result of the evolution of web and internet services. The influence of web 2.0 tools and techniques especially concepts such as media on demand, social networking, tagging, blogs, wikis and news feeds seems to be influencing the outlook of future online library catalogues. It has become mandatory that to stay relevant for both the users and the creators of current and future OPACS are to keep abreast of the web 2.0 tools and technologies.

## 2. Web 2.0

Web 2.0 started as a brainstorming conference on new web applications emerging from the ashes of the Internet dot.com collapse in 2001, and refers to the concept of warm and interactive web experience. Web 2.0 includes concepts such as social networking and participation on the Internet, user community involvement and tagging, blogs, wikis and syndicated feeds or alerts. Some of the best known Web 2.0 sites offer a public space to record and categorize data and images using folksonomy tagging for subject keywording. Delicious (<http://delicious.com/>);, Facebook (<http://www.facebook.com/>);, Flickr (<http://www.flickr.com/>) are a few standing examples of how web 2.0 tools and techniques are embedded to provide a newer kind of experience to the users. The principles of web 2.0 can be summarized as the transformation of services from a static monologue to a dynamic dialogue where collective intelligence is the key to success. The web 2.0 operates on a collective intelligence where it assumes that nobody knows everything and everybody knows something.



### Principles of web 2.0

## 3. Library 2.0

Taking a leaf out of the web 2.0 services some specialized websites like LibraryThing or Babel offer to users the possibility to describe books. In this process the user can create a personal library, share the review of his books and then discover others' books. Tools like these have created new expectations from some librarians wishing to offer the best services to their users, which gave path to the second generation of library services popularly called as “Library 2.0”. The term Library 2.0 was coined by Michael Casey in his blog *LibraryCrunch* in 2005 to refer to services which made use of the opportunities created by the web 2.0 services especially the user participation, feedback, social networking etc., A broader look at the concept of Library 2.0 will reveal that it not only makes use of the concept of web 2.0 services, instead it intends to rejuvenate various levels of services in the library, especially the technology, processes and attitudes especially in reducing the barriers used when accessing

information. This idea represents a significant change in how library services are seen and administered, where concepts like usability, interoperability and flexibility of library systems are key components. The salient features of the Library 2.0 are envisaged through a user-centered design, a patron's search to make room for the majority of users, contents come from different sources and their integration must be facilitated, attempt to use the collective intelligence above all search and research as an experience.

#### **4. Experiments in OPAC 2.0**

With libraries taking big stride in optimizing the advantages gained out of the web 2.0 services and tools, libraries establishing a newer code of service delivery with the buzzword Library 2.0, the major thrust seems to be in the areas of catalogues. OPACs are considered to be the heart of the library operations as it facilitates the patrons to the various services of the library. The impact of library catalogues used to be limited to the individual library collection since the earlier catalogues displayed only the collection of the libraries. The enormous possibilities of web 2.0 services pulled the library catalogue from that of an individual library to that of a concept of common library. North Carolina State University Libraries (NCSU) was the first library to implement an OPAC 2.0 or twenty-first century catalogue in response to the "severity of the catalog problem, particularly in the area of keyword searching". OPAC 2.0 is the application of Web 2.0 concepts to online catalogues and is also referred to as next generation, third generation or twenty-first century catalogues. OPAC 2.0 tries to take advantage of the users' potential to enrich their contributions and thus increase the value of any catalogue. This way two components of OPAC 2.0 developments enabled by Web 2.0 technologies have emerged: extending the usefulness and search features of the catalogue by harnessing more bibliographic MARC and circulation data for searching, and seamlessly incorporating data from other resources; social networking with personalization and user community tagging and reviewing to provide a richer discovery experience. With an OPAC 2.0, library users may add comment or rating to records of books they have borrowed from the library. All this information may help another reader to know if the book they just identified will satisfy them. This is just an amplification of a specific feature of OPAC 2.0. Various other functions of OPAC 2.0 are experimented either isolated or in specific groups of Integrated Library System environments. In order to see the progression towards the next generation of OPAC it becomes imperative to analyze some catalogues which provide glimpses of next generation of OPAC services.

##### **4.1. Catalogues with user interaction and profiles outside the labyrinth of Libraries**

As highlighted above user interaction is an important web 2.0 concept which will add new colour to the existing catalogues. LibraryThing for Libraries ([http://www.librarything.com/wiki/index.php/LTFL:Libraries\\_using\\_LibraryThing\\_for\\_Libraries](http://www.librarything.com/wiki/index.php/LTFL:Libraries_using_LibraryThing_for_Libraries)) is a model which allows externalizing social characteristics on library catalogues. This allows users to create a profile and share their opinions about items in their personal library. They can also connect with other users in the system to interact with each other. It allows users to create their own bibliographic collections of books online by importing catalogued data from Amazon and a large number of libraries the system accesses. Each user can add tags, comment and give them a ranking, include book covers and create discussion groups to their own collections. There are thousands of LibraryThing users who have tagged millions of books on the site. Consequently, LibraryThing has harvested a rich collection of user-generated metadata about books that it presents in tag clouds and users to make recommendations. On the other hand, libraries can use this metadata to create their catalogue. LibraryThing now allows libraries to use its collective

wisdom in local library catalogs with a small fee. By adding LibraryThing widgets to their OPACs, libraries can use LibraryThing tags to generate links between related books in their own collection. More than 200 libraries all over the world are using Library Thing in their catalogues. In this system both the users and librarians can add tags and comments, and comments from other LibraryThing users, who belong to the other libraries, can also be seen. Danbury Public Library was the first library to add the LibraryThing widgets to its catalog. <http://cat.danburylibrary.org/search~/>



Figure 1. LibraryThing tags in bookmeabook.com



Figure 2. LibraryThing tags and rating in LeedsMet Univ. catalogue

Two classic examples of how library catalogue are using LibraryThing are illustrated in Figure 1 and 2. **BookMeABook**, which boasts as "the oldest circulating library in India" is the first library that started using LibraryThing in its catalogue <http://bookmeabook.com/book/show/id/3874#>. In this service the catalogue uses book tags, rating and other readers are also linked. On the other hand University libraries like **Leeds Metropolitan University Catalogue** (<http://library.leedsmet.ac.uk/uhtbin/cgisirsi/KT6vF9s9jf/ INFO-CNTR/86600016/60/33/X>) (Figure 2), makes use of LibraryThing data to integrate almost seamlessly into its record display. Depending on the OPAC vendor and service provider, libraries have a great deal of freedom in controlling how and where the widgets display in the record. The links use the ISBN search interface of the catalog to take users to "similar books."

#### 4.2. Content enrichment on library catalogues

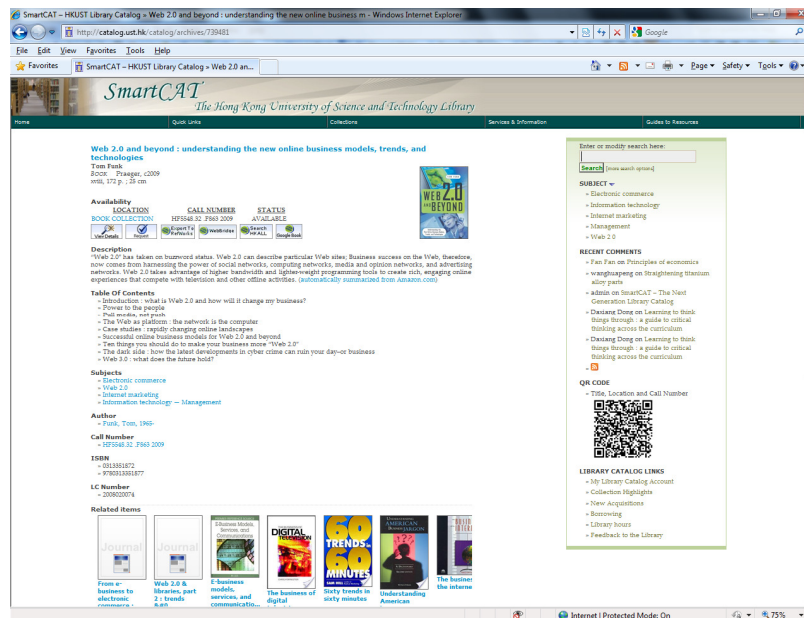
While services like LibraryThing provide a dialogue and discourse between library users, creators and facilitators through the use of content and web 2.0 tools, newer services like Syndetic Solutions from Bowkers (<http://www.bowker.com/syndetics/>) provide a wealth of OPAC enrichment options relating to all type of information sources with full integration to all the major Integrated Library Systems. These enrichments which hover around 11 million items range between cover images, author notes, table of contents to external book reviews and chapters. The choice of integration elements left with the administrators and the lack of user interaction especially in terms of rating and tagging makes this service a shade passive, but the newer Indexed Content Enrichment services offer additional search capabilities to library catalogues. They go a step further to search the table of contents to reveal extended material which the users might have missed in normal search. These kinds of enrichment services can be viewed as organized replacements for catalogues which doesn't look for user interaction,

Marketed by Bower and developed by Medialab solutions, **Aquabrowser** is another enviable OPAC 2.0 component which can act as a user friendly pleasant interface which the users can see as a frontend while it can search for items using associations, context and spelling alternatives which are automatically generated from the library's own catalogue. The Kansas City Public library catalogue, <http://catalog.kclibrary.org/> (Figure 4), which uses the aquabrowser interface demonstrates the aesthetic interface with intelligent options spiraled in its interface. Discovery options on the left of the results screen incorporates faceted, related searches, spelling variants and translations, sort options, cloud tags, social recommendations and the option of commenting on registers and voting on them. Facet options to refine searches on the right include Format, Author, Subject, Language, Series, Geographical, Person, and Year. Sort and limit by location are drop down options.



**Scriblio** A software catalogue with 2.0 applications earlier known as WPoac is an award winning, free, open source content management system and OPAC with faceted searching and browsing features based on WordPress open source blogging platform which is widely used by the blogging community. It is built directly with OPAC 2.0 with web 2.0 applications. Scriblio is a project of Plymouth State University developed by Casey Bisson, supported in part by the Andrew W. Mellon Foundation. Main features are free and open source, represents bibliographic collections — library catalogues and such — in an easily searchable, highly remixable web-based format and leverages WordPress to offer rich content management features for the entire library's content. Every bibliographic record is given its own permanent link so it can be indexed by search engines such as Google and Yahoo. Figure 5 illustrates The

Hongkong University of Science and Technology Library, at <http://catalog.ust.hk/catalog/archives/739481> which uses Scriblio.



**Figure 5: Scriblio - The Hongkong University of Science and Technology Library**

#### 4.5. Catalogues as single search source and relevance ranked display

**WorldCat local** (OCLC) is considered as the world's largest catalogue but it places your own to the fore. This is more than the world's largest catalogue; it is a discovery and delivery interface for use by a library or library consortium. With single search it connects people to all the library's materials—physical, electronic and digital—as well as to the delivery services that get them what they need. Users save time with a single search box that eliminates the need to consult separate resources and interfaces. Searches retrieve many types of resources the library provides—digital objects, electronic materials, databases, e-Journals, music, videos, e-Books, audio, maps, journals, theses and print – and delivers them to users in a single list of relevancy-ranked results. It allows libraries to combine the metadata of OCLC member libraries worldwide and customise WorldCat.org for local discovery and delivery. It features faceted browsing, cover art, and a multilingual interface, as well as customised relevancy ranking. Libraries can apply their own local branding and information. The University of Washington Libraries have implemented the first public beta version of WorldCat Local (<http://uwashington.worldcat.org>, <http://catalog.lib.washington.edu/search>). For example Arizona University Libraries have implemented this recently <http://www.library.arizona.edu/help/worldCatLocal/> (Figure 6). There are a number of initiatives to develop catalogue as a single search source for all the library material spring-up around the world. Proquest's serials solution, Swets' OneSearch are commercial products which emulate the future of OPACs for the libraries with a third-party add-on solution to future catalogues. National Library of Singapore's SearchPlus is another milestone in the creation of one-stop search for library material.



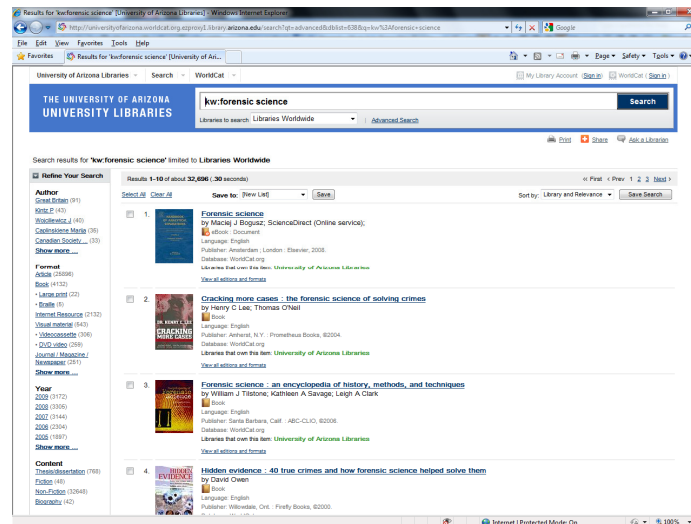


Figure 6: Catalog of Arizona University Libraries

#### 4.6. Catalogues with multiple post search choices

What is mainly lacking in most of the catalogues is the choice of post-search options or post-search refinements. **Endeca** is cataloguing software that enables 2.0 functionalities with which an OPAC can make meaningful post search outputs. It is successfully implemented in North Carolina State University Libraries at <http://www2.lib.ncsu.edu/catalog/search> (Figure 7). Endeca provides a faceted browse to the library catalogue. It provides several post search choices with which a record can be viewed clearly on the results screen page. An Endeca OPAC display does not enable tagging, annotation, or user aggregation services such as recommendation engines. The result of the search can be narrowed by subject, genre, and format; narrowed by call number range; brief view and full view of the title details; sort by relevance and so on.

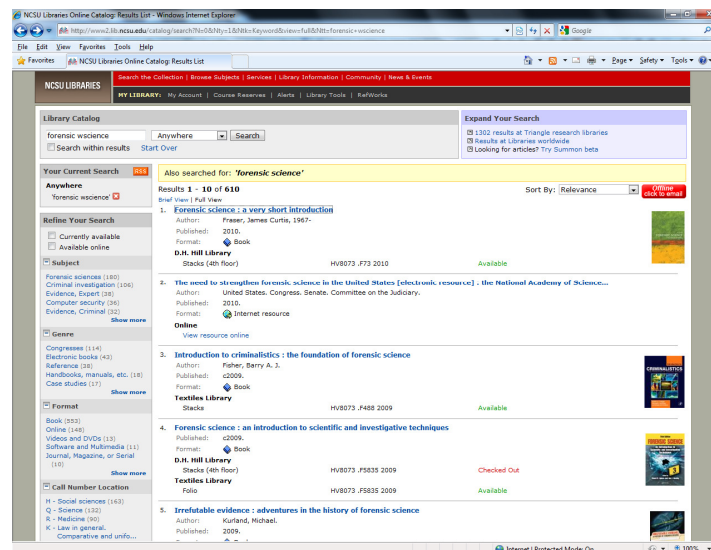


Figure 7: Endeca- North Carolina State University Libraries



#### **4.7. Library catalogues with parsed information on the fly:**

Other advancements to catalogues are the lightweight front end interfaces which can perform content encapsulation on the fly. **SOPAC** (Social Online Public Access Catalog) is a free and open source next-generation catalogue system that takes advantage of online, web 2.0-style interaction to engage users. Its initial version of SOPAC was released in 2007, and won the ALA 2009 LITA/Brett Butler Entrepreneurship Award. SOPAC, or the Social Online Public Access Catalog, incorporates all of 2.0 elements. Both a traditional catalogue and an interface that supports user interaction, SOPAC was designed by John Blyberg, Darien Library, Darien in Connecticut. SOPAC uses an open source content management system called Drupal as a structure through which the added functionality is provided. For example, when a user seeks the bibliographic information page for a catalogue record, that request is made from the user's browser to the Drupal software. The Drupal software in turn makes a request to the integrated library system for the bibliographic information it holds. The response from the ILS is parsed by the Drupal software for key information such as title, author, subjects, holdings, etc. This information is mixed with information stored in the Drupal database (ratings, tags, reviews, cover images, etc.) and a new web page is created and returned to the user's browser. The Darien Library at Darien, Connecticut, catalogue available at <http://www.darienlibrary.org/catalog/search/> is a good example for this.

#### **4.8. Modular based hybrid external library catalogues**

**VuFind** (<http://www.vufind.org>) is an interface which allows a library to create a catalogue with an external module. It allows developing a number of modules ranging from locally cached journals to other library collection and resources. It involves open and free software that functions on the system that the library already operates with. It includes the most popular 2.0 functions: commenting, tagging and bookmarking items as favourites. There is a VuFind demo available at: <http://www.vufind.org/demo/> (Figure 3). VuFind was created by Villanova University, VuFind features include search results in relevancy ranked order, facets for narrowing down results, the display of book jacket images, and user ability to contribute tags and comments. VuFind can also be used as a full scale discovery tool by not just working with the library's OPAC but also by extracting data from other sources. "It also provides a single discovery interface for other local resources such as a digital repository or local database" (Houser, 2008). This ability to provide a more complex user discovery tool and a centralized index with searching capabilities beyond the library's OPAC is a key benefit of VuFind.

#### **5. The future of online library catalogues**

With the abundance of newer interfaces and enhancements in library catalogues the future of the Online Library catalogues are poised towards an interesting time. Eventually we can say that the future catalogues will have by default an offering of a vertical portal where the results are given as relevancy ranking by default, faceted browsing, spell-check (using the catalogue database contents and community/user reviewing or tagging), RSS feeds - and more serendipity, in the form of tailored borrowing suggestions and "just in time" recommendations, and social features to allow users to build a community. Some of the salient features which will predominantly engage the future of the catalogues can be grouped as follows:

- OPAC 2.0 will allow personalization. Each user will be able to personalize the way they view the OPAC, organize their registries in folders and assign tags, configure the

searches that they perform regularly and subscribe to a RSS to get any news on the topic.

- OPAC 2.0 will allow interoperability and the syndication of contents. The link to external services, for example with bibliographical reference managers, purchasing books, etc. will be enabled with options of predefining RSS channels to disseminate the user's contents, news, topics, and authors.
- Content Enrichment and Information architecture will dominate the traditional information, encompassing the covers, the index and a summary.
- Any information displayed will be filtered through facets and groups with possibilities of the users able to retrieve and re-engage the same search for future reference
- OPAC 2.0 will enable the users to analyse and use the information more intellectually. The system will be able to recommend other information sources that a user may be interested in, as established from other similar users' search and loan information, tagging, rating and recommendation etc. It is also worth noting the registries relative to the popularity by being able to see if they have been marked as favourites, or if they have been loaned or downloaded often by other users.
- Future OPACs will enable interaction among patrons. It will enable the creation of groups of users with similar interests, allowing for different levels of relationships between them by establishing different levels of privacy.

## 6. Epilogue

With the abundance of enhancements and refinements to the current search paradigm the future of Library catalogues seems to be heading towards a meaningful destination. The future catalogues will eventually differentiate the difference between relevant and irrelevant information in a more scientific and aesthetic way. The concept of Book will be replaced with Information as the future catalogues poise towards the one search multiple output paradigm where users will have parameters to reduce noise and distortion. Using folksonomies, OPAC are poised to increase user-friendliness and interactivity. It is also observed that the folksonomic tagging for a group of books and the library-supplied subject headings for the same books shows that users and cataloguers approach these descriptors very differently and noted that the attractive feature of folksonomies is their inclusiveness; they reflect the vocabulary of the users, regardless of viewpoint, background, bias, and so forth (Rolla, 2009). In this evolving environment to stay relevant to the current and next generation libraries need to reorient themselves towards the needs of the users and countless possibilities provided by the technology to provide relevant information in a relevant format in a quicker time frame. Though the journey towards the next generation of OPAC seems arduous, inevitably the user interaction and input along with the innovations of technology will trigger a wave of meaningful additions to the existing OPAC propelled towards the next generation of OPACs known as OPAC 2.0.

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